

SECTION 32 31 10
FENCES AND GATES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This work consists of all labor, materials, and equipment necessary for furnishing and installing in conformance with the lines, grades, and details as shown; the following:
1. Chain link fence and accessories.
 2. Ornamental picket cantilever electrically-operated slide crash gate.

1.2 RELATED WORK

- A. Grounding of fencing for enclosures of electrical equipment and for lightning protection as shown: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- B. Temporary Construction Fence: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Finish Grading: Section 31 20 00, EARTH MOVING, and Section 32 90 00, PLANTING.
- D. Guard Booth: Section 13 34 29, PREFABRICATED GUARD BOOTH.
- E. Electrical Power Requirements: Division 26 Sections.
- F. Card readers and biometric devices: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS

1.3 MANUFACTURER'S QUALIFICATIONS

- A. Fence, gates, and accessories shall be products of manufacturers' regularly engaged in manufacturing items of type specified.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, furnish the following:
1. Manufacturer's Literature and Data: Chain link fencing, gates and all accessories.
 2. Manufacturer's Certificates: Zinc-coating complies with specifications.
- B. Shop Drawings for fences and gates.
- C. Certification that fence alignment meets requirements of contract documents.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- A392-07.....Zinc-Coated Steel Chain-Link Fence Fabric
 - C94/C94M-07.....Ready-Mixed Concrete
 - F567-07.....Installation of Chain-Link Fence
 - F626-(R2003).....Fence Fittings
 - F900-05.....Industrial and Commercial Swing Gates
 - F1043-06.....Strength and Protective Coatings on Metal
Industrial Chain-Link Fence Framework
 - F1083-08.....Pipe, Steel, Hot-Dipped Zinc-Coated
(Galvanized) Welded, for Fence Structures.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Basis-Of-Design Product: Subject to compliance with requirements, provide Anchor Fence, Division, Master-Halco, Inc. or comparable products from one of the following:
1. Allied Tube and Conduit Corp.
 2. American Fence Corp.
 3. Boundary Fence & Railing Systems, Inc.
 4. Merchant Metals.
 5. Security Fence Manufacturing & Supply Co., Inc.

2.2 GENERAL - CHAIN LINK FENCE

- A. Materials shall conform to ASTM F1083 and ASTM A392 ferrous metals, zinc-coated; and detailed specifications forming the various parts thereto; and other requirements specified herein. Zinc-coat metal members (including fabric, gates, posts, rails, hardware and other ferrous metal items) after fabrication shall be reasonably free of excessive roughness, blisters and sal-ammoniac spots.

2.3 CHAIN-LINK FABRIC

- A. ASTM A392 9 gauge wire woven in a 50 mm (2 inch) mesh. Top and bottom selvage shall have twisted and barbed finish. Zinc-coating weight shall be 2.0 ounces per square foot.
- B. Height shall be 8 feet along property line. Two-inch clearance at ground line. Minimum 7 mil polyvinyl chloride (PVC) plastic resin

finish over galvanized steel wire. Color: Black, refer to Section 09 06 00, Schedule of Finishes.

2.4 POST, FOR GATES AND FENCING

- A. ASTM F1083, Grade SK-40A, round, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification. Provide post braces and truss rods for each gate, corner, pull or end post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.
- B. Line posts shall be 2-1/2 inches O.D.; corner posts shall be 3 inches O.D.; gate posts shall be 4 inches O.D., 6 inches O.D. for swing gates at dumpster enclosures. Height shall be sufficient to accommodate fabric height and ground clearance. Steel Framework Finish: Provide framework and all exposed fittings and accessories in accordance with manufacturer's standard thermally bonded polyvinyl chloride (PVC) plastic resin finish over galvanizing, not less than 10 mils (0.010 inch) thick. Color to match chain link fabric.

2.5 TOP RAIL AND BOTTOM RAIL

- A. ASTM F1083, Grade SK-40A, round, 1-5/8 inch outside diameter, zinc-coated steel. Dimensions and weights of posts shall conform to the tables in the ASTM Specification; fitted with suitable expansion sleeves and means for securing rail to each gate, corner, and end posts.
- B. Steel Framework Finish: Provide framework and all exposed fittings and accessories in accordance with manufacturer's standard thermally bonded polyvinyl chloride (PVC) plastic resin finish over galvanizing, not less than 10 mils (0.010 inch) thick. Color to match chain link fabric.

2.6 ACCESSORIES

- A. Accessories as necessary caps, rail and brace ends, wire ties or clips, braces and tension bands, tension bars, truss rods, and miscellaneous accessories conforming to ASTM F626.

2.7 ORNAMENTAL PICKET CANTILEVER SLIDE GATE CRASH GATE

- A. Gate frames:
 - 1. Fabricate cantilever slide gate top frame using (2) 2" (50 mm) square aluminum members, ASTM B 221, alloy and temper 6063-T6, weighing 1.88 lb/ft (2.78 kg/m).
 - 2. Weld members together forming rigid one-piece frame integral with top track (no substitution).

3. Provide 2 truck assemblies for each gate leaf.
4. Bottom rail 2" x 4" (50 mm x 100 mm) aluminum member weighing 1.71 lb/ft (2.54 kg/m).
5. Gates over 27' (8230 mm) in single opening shall be shipped in 2 parts and field spliced with special attachments provided by the manufacturer.
6. For gates over 15'-0" Opening:
 - a. Internal uprights: 1" x 2" (25 mm x 50 mm) aluminum members welded in gate frames at maximum 6'-2" (1880 mm) face-to-face, subdividing frame into panels. Gates under 15'-0" will have two equal panels.
 - b.

<u>Gate Actual Opening Sizes</u>	<u>Cantilever Support (Overhang)</u>
12 ft (3658mm)	10'-0" (3038mm)
14 ft (4267mm) to 24 ft (7315mm)	12'-0" (3658mm)

B. Ornamental picket Infill:

1. "U" channel rails formed aluminum, 1-3/8" (35 mm) wide x 1-1/2" (38 mm) deep, 11 gauge [0.120" (3.05 mm)] wall thickness.
2. Punch rails to receive pickets and welded inside gate frame.
3. Pickets galvanized steel, [1" (25 mm)] square tube [of gauge, spacing, and with accessories to match fence].
4. Attach pickets to "U" rails by 1/4" (6 mm) industrial drive rivets # MIW 381080691.

C. Bracing: Provide diagonal adjustable length truss rods, of 3/8" (9.5 mm) galvanized steel, in each panel of gate frames.

D. Top track/rail: Enclosed, combination one-piece track and rail, aluminum extrusion with weight of 4.66 lb/ft (6.93 kg/m). Track to withstand reaction load of 2,000 lb (907 kg/m).

E. Truck assembly:

1. Swivel type, zinc die cast, with 10 sealed lubricant ballbearing rollers 2" (50 mm) in diameter by 9/16" (14 mm) in width, and 2 side rolling wheels to ensure truck alignment in track (no substitution).
2. Mount trucks on post brackets using 7/8" (22 mm) diameter ball bolts with 1/2" (13 mm) shank.
3. Design truck assembly to withstand same reaction load as track.

F. Gate hangers, latches, brackets, guide assemblies, and stops: Malleable iron or steel, galvanized after fabrication. Provide positive latch with provisions for padlocking.

- G. Bottom guide wheel assemblies: Each assembly shall consist of two 4" (100 mm) diameter rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.
- H. Gates posts For crash gate:
1. 2 pair of support post (dual) galvanized steel, 4 inches (100 mm) square, weighing 9.59 lb/ft (14.27 kg/m) each.
 2. Posts connected by welding 6 inch x 3/8 inch (12.7 x 9.5 mm) plate between posts as shown on drawings.
 3. One 4" (100 mm) latch post.
- I. Accessories: Pre-assemble panels with ornamental accessories attached with industrial drive rivets to prevent removal and vandalism.
- J. Finish:
1. After components have been galvanized (inside and out) to provide maximum corrosion resistance, clean and pretreat with phosphate to form amorphous structure on galvanized surface for superior powder coating adhesion.
 2. Give phosphate coated surfaces a thorough water rinse to prepare surface for seal rinse.
 3. Seal rinse with non-chromated solution to improve corrosion resistance and adhesion of finish coat.
 4. Bake metal dry, prior to application of powder coating.
 5. Apply 2.5 mil (0.0635 mm) thickness of polyester resin based powder coating by electrostatic spray process.
 6. Bake finish for 20 minutes (1.2 Ks) at 450°F (232°C), metal temperature.
 7. Color: Black, Refer to SECTION 09 06 00, SCHEDULE OF FINISHES.
- K. 12 inch wide flange beam 53 lb/ft.
- L. 14 inch (356 mm) OD X ½ inch wall thickness bollard filled with reinforced concrete.

2.8 ELECTRIC GATE OPERATION

- A. Gate to be operated by Model XL 1 HP, hydraulic operator and locked utilizing an electric lock with indicating lights. All components of the manual override shall be securely enclosed and locked in a 10 gage steel enclosure, conforming to the following requirements:
1. 1 HP motor, 460 volt - Three Phase.
 2. Operator shall be tested to UL 325 standards and is ETL listed.

3. Limit switches shall be readily adjustable with normal hand tools securely locked in place after adjustment - switch contacts rated 6 amps.
4. Spring-loaded friction feed type drive mechanism, consisting of two drive wheels, a manual toggle-style disconnect to instantly disengage the drive wheels for manual operation.
5. Gate speed shall be 1.2 fps.
6. Drive rail 6061-T6 aluminum, 3/16 inch thick.

2.9 CONCRETE

- A. ASTM C94/C94M, using 19 mm (3/4 inch) maximum-size aggregate, and having minimum compressive strength of 25 mPa (3000 psig) at 28 days. Non-shrinking grout shall consist of one part Portland cement to three parts clean, well-graded sand, non-shrinking grout additive and the minimum amount of water to produce a workable mix.

PART 3 - EXECUTION

3.1 INSTALLATION - CHAIN LINK FENCE

- A. Install fence by properly trained crew, on previously prepared surfaces, to line and grade as shown. Install fence in accordance with ASTM F567 and with the manufacturer's printed installation instructions, except as modified herein or as shown. Maintain all equipment, tools, and machinery while on the project in sufficient quantities and capacities for proper installation of posts, chain links and accessories.
- B. A Registered Professional Land Surveyor or Registered Civil Engineer specified in Section 01 00 00, GENERAL REQUIREMENTS, shall stake out and certify the fence alignment to meet the requirements as shown.

3.2 EXCAVATION

- A. Excavation for concrete-embedded items shall be of the dimensions shown, except in bedrock. If bedrock is encountered before reaching the required depth, continue the excavation to the depth shown or 450 mm (18 inches) into the bedrock, whichever is less, and provide a minimum of 50 mm (2 inches) larger diameter than the outside diameter of the post. Clear loose material from post holes. Grade area around finished concrete footings as shown and dispose of excess earth as directed by the Resident Engineer.

3.3 POST SETTING

- A. Install posts plumb and in alignment. Set post in concrete footings of dimensions as shown, except in bedrock. Thoroughly compact concrete so

as it to be free of voids and finished in a slope or dome to divert water running down the post away from the footing. Straight runs between braced posts shall not exceed 150 m (500 feet). Install posts in bedrock with a minimum of 25 mm (one inch) of non-shrinking grout around each post. Thoroughly work non-shrinking grout into the hole so as to be free of voids and finished in a slope or dome. Cure concrete and grout a minimum of 72 hours before any further work is done on the posts.

3.4 POST SETTING IN STRUCTURES

- A. Install post in retaining walls, curbs, concrete slabs, or similar construction in proper size galvanized pipe sleeves set into the concrete or built into the masonry as shown. Set sleeves plumb and 13 mm (1/2 inch) above the finished structure. Fill space solidly between sleeve and post with non-shrinking grout, molten lead, or sulphur, and finish to divert water running down the post away from the post base.

3.5 POST CAPS

- A. Fit all exposed ends of post with caps. Provide caps that fit snugly and are weathertight. Where top rail is used, provide caps to accommodate the top rail. Install post caps as recommended by the manufacturer and as shown.

3.6 TOP RAILS AND BOTTOM RAILS

- A. Install rails before installing chain link fabric. Provide suitable means for securing rail ends to terminal and intermediate post. Top rails shall pass through intermediate post supporting arms or caps as shown. The rails shall have expansion couplings (rail sleeves) spaced as recommended by the manufacturer. Where fence is located on top of a wall, install expansion couplings over expansion joints in wall.

3.7 ACCESSORIES

- A. Supply accessories (posts braces, tension bands, tension bars, truss rods, and miscellaneous accessories), as required and recommended by the manufacturer, to accommodate the installation of a complete fence, with fabric that is taut and attached properly to posts, rails, and tension wire.

3.8 FABRIC

- A. Pull fabric taut and secured with wire ties or clips to the top rail and bottom rail close to both sides of each post and at intervals of not more than 600 mm (24 inches) on centers. Secure fabric to posts using stretcher bars and ties or clips.

3.9 ORNAMENTAL PICKET CANTILEVER SLIDE GATE CRASH GATE FRAMING INSTALLATION

- A. Install gate post in accordance with manufacturer instructions.
- B. Concrete set gate posts:
 - 1. Drill holes in firm, undistributed or compacted soil.
 - 2. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6" (152 mm) deeper than post bottom.
 - 3. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads.
 - 4. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil.
 - 5. Place concrete around posts in a continuous pour, tamp for consolidation.
 - 6. Trowel finish around post and slope to direct water away from posts.
- C. Gate posts and hardware: Set keepers, stops, sleeves and other accessories into concrete. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

3.10 ORNAMENTAL PICKET CANTILEVER SLIDE GATE CRASH GATE INSTALLATION

- A. Install gates plumb, level, and secure for full opening without interference.
- B. Attach electric gate operator and hardware by means which will prevent unauthorized removal.
- C. Adjust electric gate operator hardware for smooth operation.

3.11 REPAIR OF GALVANIZED SURFACES

- A. Use galvanized repair compound, stick form, or other method, where galvanized surfaces need field or shop repair. Repair surfaces in accordance with the manufacturer's printed directions.

3.12 FINAL CLEAN-UP

- A. Remove all debris, rubbish and excess material from the station.

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